



5.2 One-to-One Functions; Inverse Functions

2017-2018

Name _____ Date _____ Period _____

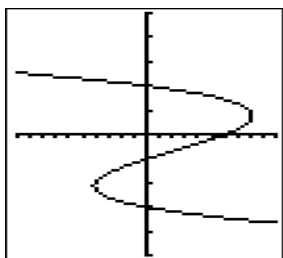
Determine whether the function is one-to-one.

1. $\{(-2,5),(-1,3),(3,7),(4,12)\}$

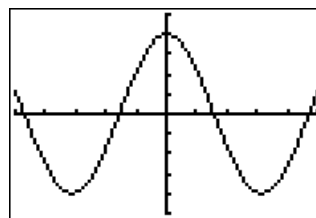
2. $\{(2,6),(-3,6),(4,9),(1,10)\}$

In each exercise determine a) whether the relation is a function and b) whether the relations inverse is a function.

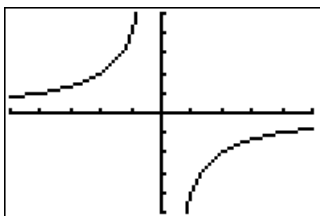
3.



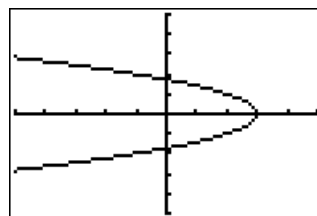
4.



5.



6.



Find the inverse of each one-to-one function, then state the domain and range of each inverse function.

7. $\{(-2,2),(-1,6),(0,8),(1,-3),(2,9)\}$

8. $\{(-2,-8),(-1,-1),(0,0),(1,1),(2,8)\}$

Confirm that f and g are inverses by showing that $f(g(x)) = x$ and $g(f(x)) = x$. Give any values of x that need to be excluded from the domain of f and the domain of g . Show work!

9. $f(x) = 3x - 2$ and $g(x) = \frac{x+2}{3}$

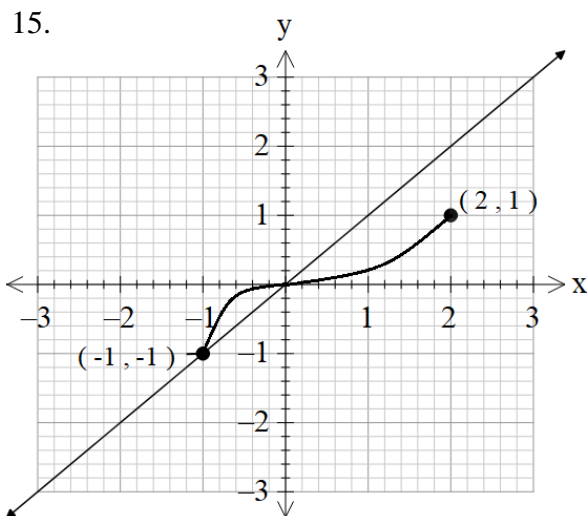
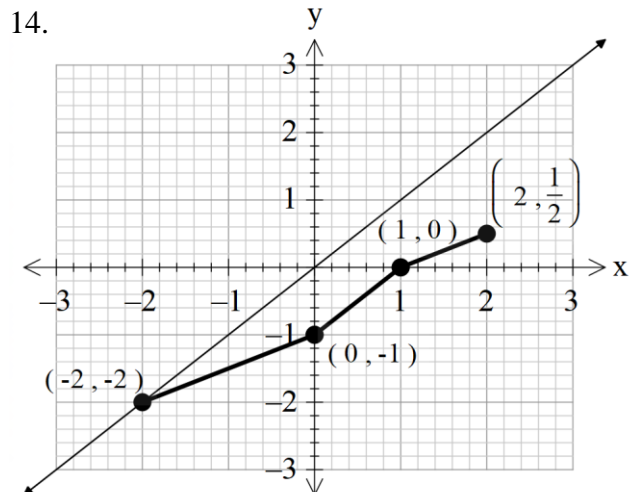
10. $f(x) = \frac{x+3}{4}$ and $g(x) = 4x - 3$

11. $f(x) = x^3 + 1$ and $g(x) = \sqrt[3]{x-1}$

12. $f(x) = \frac{x+1}{x}$ and $g(x) = \frac{1}{x-1}$

13. $f(x) = \frac{1}{2}x^2 - 5, x \geq 0$ and $g(x) = \sqrt{2x+10}$

The graph of a one-to-one function f is given. Draw the graph of the inverse function f^{-1} . The graph of $y = x$ is also given for convenience.



The function f is one-to-one. Find its inverse and check your answer. Show work!

16. $f(x) = 3x - 6$

17. $f(x) = 2x + 5$

18. $f(x) = \frac{2x-3}{x+1}$

19. $f(x) = \frac{x+3}{x-2}$

20. $f(x) = \sqrt{x-2}$

21. $f(x) = \sqrt{x+5}$

22. $f(x) = x^3 + 4$

23. $f(x) = \sqrt[3]{x+3} - 2$

24. $f(x) = (x-1)^3 + 6$

25. $f(x) = \frac{1}{2}\sqrt{x-1} - 3$

26. Use the graph from problem 14 to evaluate the following:

a) $f(2)$

b) $f(1)$

c) $f^{-1}(0)$

d) $f^{-1}(-1)$

27. If $f(7) = 13$ and f is one-to-one, what is $f^{-1}(13)$?

28. The domain of a one-to-one function g is $(-\infty, 0]$, and its range is $[0, \infty)$. State the domain and the range of g^{-1} .

29. A function $y = f(x)$ is increasing on the interval $(0, 5)$. What conclusion can you draw about the graph of $y = f^{-1}(x)$?

30. A function f has an inverse function. If the graph of f lies in quadrant I, in which quadrant does the graph of f^{-1} lie?

Review Exercises

Multiply the polynomials. Show work!

31. $(x-7)(x+7)$

32. $(x-7)^2$

33. $(x+7)^2$

Solve the quadratic equation by using the quadratic formula. Show work!

35. $2x^2 - 5x + 7 = 0$

36. If $f(x) = 2x - 1$ and $g(x) = \frac{1}{x}$ find $(f \circ g)(x)$ and state the domain of the new function.